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ANSWER TO PROF. HALL'S QUERY (SEE P. 48) BY PROF. H. T. EDDY.

Take the well known Eulerian integral

$$\int_0^{\frac{\pi}{2}} \sin^p\varphi \cos^q\varphi \, d\varphi = \frac{\Gamma\left(\frac{p+1}{2}\right)\Gamma\left(\frac{q+1}{2}\right)}{2\Gamma\left(\frac{p+q+2}{2}\right)};\ p = \tfrac{1}{2},\ q = 0.$$

$$\therefore \qquad u = \frac{\Gamma(\frac{3}{4})\,\Gamma(\frac{1}{2})}{2\Gamma(\frac{5}{4})} = \frac{\sqrt{\pi}}{2}\cdot\frac{\Gamma(\frac{3}{4})}{\Gamma(\frac{5}{4})}.$$

Again, $\dfrac{[\Gamma(n)]^2}{\Gamma(n-m)\Gamma(n+m)} = \left(1-\dfrac{m^2}{n^2}\right)\left(1-\dfrac{m^2}{(n+1)^2}\right)\left(1-\dfrac{m^2}{(n+2)^2}\right)\ldots.$

In this equation make $m = \frac{1}{4}$, and, first, put $n = \frac{3}{4}$ and then $n = \frac{5}{4}$. Dividing the first result by the second we get

$$\frac{\Gamma(1)\,\Gamma(\frac{3}{2})\,[\Gamma(\frac{3}{4})]^2}{\Gamma(\frac{1}{2})\,\Gamma(1)\,[\Gamma(\frac{5}{4})]^2} = \frac{[\Gamma(\frac{3}{4})]^2}{2[\Gamma(\frac{5}{4})]^2}.$$

$$\therefore \qquad u = \left[\frac{\pi}{2}\cdot\frac{\frac{25}{24}\cdot\frac{81}{80}\cdot\frac{169}{168}\cdot\frac{289}{288}\cdot\frac{441}{440}\cdot\frac{625}{624}\cdot\frac{841}{840}\cdot\ldots}{\frac{8}{9}\cdot\frac{49}{48}\cdot\frac{121}{120}\cdot\frac{225}{224}\cdot\frac{361}{360}\cdot\frac{529}{528}\cdot\frac{729}{728}\cdot\ldots}\right]^{\frac{1}{2}},$$

which is in a form convenient for computation from a table of logarithms, and especially it is easy to obtain the logarithms of the fractions at the right of those given as they are simple tabular differences. Fifteen terms or perhaps less, are sufficient to obtain $u = 1.198\ldots$

ANSWER TO MR. HEAL'S QUERY. (SEE PAGE 64.)

[T. P. STOWELL of Rochester, N. Y., writes: "Perhaps it would interest some of your readers to reprint a paper published in the Math. Repository (Vol. I, 2nd series) in 1806." As our space will net permit the publication of the paper referred to, in full, we give the following extract, and subjoin the Construction of a polygon of 17 sides, sent by Mr. Stowell, and credited to Leybourn's Math. Repository, 1818.]

"Mr. Gauss, of Brunswic, published at Leipsic, in 1801, a work called *Disquisitiones Arithmeticae.* In this work the author announces, that we may always inscribe a regular polygon of $2^n + 1$ sides in a circle, when n is a whole number, and 2^n+1 a prime number.

"Mr. Legendre has given to the French National Institute a demonstration of this very curious proposition in the case when the number of sides is 17. It is founded on these two lemmas:

Lemma I. Let a be the arch of a circle, m and n two whole numbers then $\qquad 2\cos ma\cos na = \cos(m-n)a + \cos(m+n)a.$

Lemma II. Let a be the nth part of a whole circumference n being a whole number, then

$$\cos a + \cos 2a + \cos 3a + \ldots + \cos na = 0."$$